lizer plants, for example, and invited American scientists and engineers to China to help set them up. Dealings with the Boeing Company have included the training of Chinese scientists sent to Seattle. The Chinese are negotiating with American steel companies and American oil companies are in China to help with the exploration for oil reserves.

But in the area of more academic scientific exchanges, the relations between the two countries have been less substantial. Press points out that, although there has been a lot of travel to and from the People's Republic, delegations mainly have had only survey tours of the other's country—a day or two here and there, but no long-term stays and no follow-up.

However, there are plenty of indications that things are changing rapidly. In a recent report, the Committee on Scholarly Communications with the People's Republic of China (CSCPRC) observes that "Until about six months ago, most letters from American scientists to their Chinese counterparts either went unanswered, or were answered in the most formal manner." Now, quite suddenly, Chinese researchers have begun substantive correspondence with some American scientists, including an exchange of papers, data, charts, and the like.

The CSCPRC also reports that this year exchanges are planned in a large number of fields: cancer, electrical and hydraulic metallurgy, computer sciences, engineering, agricultural sciences, oceanography, light construction, and nuclear and plasma physics. In addition, the Chinese Academy of Sciences has sent a team of physicists to Fermi Lab for 2 months; others are expected to visit at Fermi for 6 months or longer. And a delegation of scientists recently spent a week at the Gordon Conference on Nuclear Chemistry in New Hampshire, where they participated actively in scientific discussion. Press expects that one of the first tangible results of his recent trip will be the arrival of Chinese students at American universities, with the Chinese self-reliantly paying their own way.

In light of the range of activity that is under way between China and the United States in the wake of the new Chinese commitment to modernization in science and technology, some observers who diplomatically prefer not to be quoted see the Press trip to Peking as "mainly symbolic," and "more a product of Chinese self-interest than U.S. accomplishment." Nevertheless, in a realm in which symbols count for a lot, the government-to-government exchange could well mark a turning point in Sino–U.S. relations.—BARBARA J. CULLITON

Encounters with the Third World Seen in Allocating Frequencies

WARC, which stands for World Administrative Radio Conference, is hardly a household acronym. However, WARC is likely to achieve a higher recognition quotient because it deals with one of those subjects which were formerly regarded as essentially technical, but have taken on serious international economic and political implications.

At issue is the electromagnetic spectrum, or at least that portion of it used for telecommunications. WARC is a function of the International Telecommunication Union (ITU); a major conference is held every 20 years, the principal purpose of which is to allocate frequencies. The next one is set for September of next year in Geneva.

In the past, even at the last big conference in 1959, the industrial nations, with the United States taking the lead by virtue of its technical supremacy, got pretty much what they wanted at WARC. In the past two decades, however, the explosion of electronics and space technology, particularly the development of satellite communications, vastly increased civil and military uses of the spectrum and sharpened competition for access to frequencies. At least as important, less developed countries (LDC's) recognized the value of a place in the spectrum and began to organize to assert their claims.

The LCD's arguments for a more equal footing in telecommunications directly parallels those they make in demanding acceptance of a so-called New World Economic Order. The LDC's have used the United Nations as a principal venue for pushing their case for greater access to technology, capital, and resources which they see as unfairly monopolized by industrial nations, particularly by the former colonial Western countries. The parallel in the communications sphere is made explicit by the LDC's calling for a "New World Information Order." The LDC's will have considerable leverage at WARC because of the ITU's one-nation, one-vote formula for decisions. They constitute a sizable majority in the ITU where membership has grown from less than 100 nations in the time of the 1959 meeting to 154 today.

Under the prevailing rules, ITU lays out sectors of the spectrum for various uses—radio and television broadcasting, satellite communications, maritime radionavigation, for example. The frequencies have then been utilized on a first-come, first-served basis. The advantage, therefore, has been with the nations which were technically most sophisticated and quickest off the mark. The LDC's have made it clear that they want to modify the system. Their first concern is thought to be to gain more scope for their own domestic broadcasting, but there are indications that at least some of the LDC's want to share the higher frequencies used for more sophisticated communications, and, if they can't use them immediately, to gain what, in effect, are "parking" rights.

Unquestionably, the American stake in WARC is very substantial. The potential effects of changes seriously unfavorable to the United States are indicated in a 1977 Senate Foreign Relations Committee staff report which takes a broad look at communications problems in the perspective of international politics.* As part of their conclusions, the report's authors suggest what, "At its worst," the New World Information Order could mean for the United States. In the national security sphere this country could lose access to frequencies now relied on for military communications, radar, and missile operations. The present wide use of satellites for both military and civilian purposes—weather, crop, and naviga-

**The New World Information Order*, a report by George Kroloff and Scott Cohen to the Senate Committee on Foreign Relations.

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tion satellites, for example—could be adversely affected. Space research and other scientific activities such as radioastronomy are vulnerable in the competition for frequencies (*Science*, 30 June). The economic consequences of changes in the allocation of frequencies could be very great, ranging from higher telephone bills to losses arising from restriction or increased cost of the huge flow of data made possible by the linkage of computers to modern communications systems.

In assessing the issues that will influence the atmosphere of the Geneva WARC, it is impossible to ignore the dispute between the LDC's and Western nations over the operations of international news media. The LDC's have been unhappy about the dominance of Western news organizations in the coverage and dissemination of world news. They feel that too little attention is given to LDC's and that what news is carried tends to be unfavorable and unfair to them. At the last biennial meeting of Unesco in Nairobi in 1976, the LDC's supported a declaration on the mass media which had its origins in the Soviet bloc. The effect of the declaration would be to give governments greater control over news generated and consumed within their own boundaries and more responsibility for the activities of their own journalists. Implementation of such a declaration would severely restrict press freedom as it is interpreted in the West and was strenuously opposed by the United States and other Western countries. Action on the declaration was diplomatically delayed, but the subject is expected to come up again at the Unesco general meeting scheduled to begin in Paris in late October. And many observers think that LDC's may be disposed to pursue the principles of the mass media declaration through joint action at WARC. A showdown on the issue may be deferred or deflected by the deliberations of a group of "wise men" commissioned by Unesco. Scheduled to report next year, these practical philosophers are expected to give guidance on the mass media issue but in the context of much broader recommendations on how the LDC's can participate most profitably in global communications development for the rest of the century.

For the United States, the odds on a worst case analysis coming true at WARC do not appear to be overwhelming. U.S. officials are split on the likely effects of the mass media issue. Some believe that a majority of the LDC's are primarily interested in broadcasting frequencies in the lower-frequency part of the spectrum and in the development of their basic national communications networks. The United States is still regarded as the principal source of technology and technical assistance, and these officials feel that if the U.S. government demonstrates an understanding of LDC priorities and offers real assistance in achieving them, the LDC's will concentrate on technical rather than political issues at WARC.

At least until recently, there was considerable apprehension on Capitol Hill and in U.S. industry that the government might drift into difficulty at WARC by default. There seemed to be no recognition at the top of the Administration of the importance of international information and communications problems in general or of WARC in particular.

Change in the Picture

This year, the picture has changed somewhat, in part because of remonstrances from legislators concerned about the lack of U.S. policy on international information issues. Such legislators include Representative Dante B. Fascell (D-Fla.) and Senator Ernest F. Hollings (D-S.C.). Secretary of State Cyrus R. Vance placed responsibility for coordination of international communications matters with Deputy Secretary Warren Christopher, the State Department's number two man. An interagency review of communications policy was called for and White House interest in the matter is indicated by the reputed existence in draft form of a presidential review memorandum on international communications.

As for WARC, itself, Glen Robinson, a University of Virginia law professor, has been named to head the delegation to the conference and a special office has been established at State. Robinson will have the temporary rank of ambassador for the period of the conference.

Actually, while there may have been insouciance on the subject at the top, the government has hardly been totally indifferent to WARC. In fact, literally hundreds of lower-level officials have been beavering away at preparations. One estimate puts the number at more than 600 involved in various aspects of the very complicated preliminaries.

The United States is unusual in its fully developed, dual, public-private communications system. The Federal Communications Commission (FCC) is responsible for formulation of the nonfederal requirements for WARC through consultation with industry and other nongovernment users. The National Telecommunications and Information Administration (NTIA) does the same for federal users. NTIA is also charged with reconciling the two streams of requirements and formulating consistent federal policy. In the United States, about half of the use of frequencies is nonfederal and half federal. Roughly half of the federal use is military. The State Department has the responsibility for international negotiations and is now in the process of forming the delegation that will go to WARC.

These signs of activity seem to have had the effect of somewhat quieting expressions of alarm about the state of U.S. policy, although the congressional critics have hardly lost interest. The Senate version of the State Department authorization bill contains a section on international communications policy which requires the President by next 20 January to report to Congress on "procedures he has established by which to develop and maintain a comprehensive United States policy regarding international communications and information issues." And, on the subject of WARC, Hollings is expected to seek a progress report on preparations for the conference before Congress adjourns at a special hearing by the Senate Commerce Committee's communications subcommittee which he chairs. WARC, of course, is still more than a year away, and with so many variables at play, predictions on the outcome must be taken with some skepticism. One interesting question is whether the Soviet Union and the United States will be at odds over specific issues at WARC. The two superpowers are the biggest users of the spectrum and there are reports that the Soviet Union is demonstrating a certain coolness to the idea of a New World Information Order. But, especially in view of the present tensions between the two countries, it is unclear whether a community of interest will lead them to make common cause at WARC.

No informed observer expects the status quo to be unchallenged or unchanged at the 1979 WARC. For a very long time the electromagnetic spectrum has been, so to speak, an American lake. The change in circumstances is summed up by a quote attributed to a Sudanese minister, Ali Shummo, which is cited almost ritually by commentators on WARC. "You (the industrial nations) have 10 percent of the population and 90 percent of the spectrum and we (the LDC's) have 90 percent of the population and 10 percent of the spectrum. We want our share." He did not have to add that at WARC the LDC's will also have the votes.—JOHN WALSH